

## CLAIMS

What is claimed is:

1. An ocular implant, comprising:
  - (a) a bioabsorbable substrate;
  - (b) a microfabricated membranous tissue layer secured to said bioabsorbable substrate; and
  - (c) cells on the surface of said microfabricated membranous tissue layer, said cells separated into regions on said surface by creating a pattern on said surface enclosing said regions for receiving said cells.
2. The ocular implant as set forth in claim 1, wherein said tissue of said microfabricated membranous tissue layer is selected from the group consisting of lens capsule, inner limiting membrane, corneal tissue, Bruch's membrane tissue, amniotic membrane tissue, serosal membrane tissue, mucosal membrane tissue and neurological tissue.
3. The ocular implant as set forth in claim 1, wherein said cells are cells selected from the group consisting of IPE cells, RPE cells and stem cells.

4. The ocular implant as set forth in claim 1, wherein said cells are received on said surface *in situ* or *in vivo*.
5. The ocular implant as set forth in claim 1, wherein said cells on said microfabricated membranous tissue layer are separated by growth inhibitory barriers.
6. The ocular implant as set forth in claim 1, wherein said cells are separated by a patterned stencil.
7. The ocular implant as set forth in claim 1, wherein said bioabsorbable substrate comprises a material selected from the group consisting of glass, collagen, glycosaminoglycans, chitosan; poly(hydroxyalkanoates), poly( $\alpha$ -hydroxy acids), polyglycolic acid (PGA), polylactic acid (PLA), polylactide-polyglycolide (PGA-PLA) mixtures, alloys and copolymers (PLGA), poly(dioxanones), poly( $\epsilon$ -caprolactone); poly(ortho esters), poly(anhydrides),

poly(phosphazenes), poly(amino acids), and other compounds, polymers, copolymers, alloys, mixtures and combinations thereof.

8. The ocular implant as set forth in claim 1, wherein said bioabsorbable substrate is formed of a material selected from the group consisting of poly-lactic acid, polyglycolic acid, polyorthoesters, polyanhydrides, polyphosphazines, poly-lactic acid glycolic acid copolymers, polyethylene glycol/polylactic acid copolymers and blends and copolymers thereof.
9. The ocular implant as set forth in claim 1, wherein said microfabricated membranous tissue layer is about 2 to about 5 micrometers in thickness.
10. The ocular implant as set forth in claim 1, wherein said microfabricated membranous tissue layer has micropores or pits.

11. The ocular implant as set forth in claim 1, wherein said microfabricated membranous tissue layer has a micropattern of biomolecules.

12. The ocular implant as set forth in claim 11, wherein said biomolecules of said micropattern of said microfabricated membranous tissue layer are selected from the group consisting of proteins, peptides, organic molecules, oligosaccharides, and small chain polymers.

13. The ocular implant as set forth in claim 11, wherein one or more of said biomolecules of said micropattern of said microfabricated membranous tissue layer are selected from the group consisting of poly (methyl methacrylate), polystyrene, poly (methyl styrene), collagen, keratin sulfate, hyaluronic acid, glycosaminoglycan, octadecyltrichlorosilane, silane polymers, polylysine, polylactic glycolic acid (PLGA)-derivatized polylysine and polylysine peptides.

14. The ocular implant as set forth in claim 1, wherein said ocular implant is in a subretinal space.

15. The ocular implant as set forth in claim 1, further comprising a microfluidic network placed onto said microfabricated membranous tissue layer.

16. An implant, comprising:

(a) a polymeric substrate;

(b) a membranous tissue layer secured to said polymeric substrate; and

(c) an array of cells on the surface of said membranous tissue layer, wherein said cells are separated into regions on said surface defining said array by creating a pattern on said surface enclosing said regions for receiving said cells.

17. The implant as set forth in claim 16, wherein said tissue of said microfabricated membranous tissue layer is selected from the group consisting of lens capsule, inner limiting membrane, corneal tissue, Bruch's membrane tissue, amniotic

membrane tissue, serosal membrane tissue, mucosal membrane tissue and neurological tissue.

18. The implant as set forth in claim 16, wherein said cells are cells selected from the group consisting of IPE cells, RPE cells and stem cells.
19. The implant as set forth in claim 16, wherein said cells are received on said surface *in situ* or *in vivo*.
20. The implant as set forth in claim 16, wherein said cells on said microfabricated membranous tissue layer are separated by growth inhibitory barriers.
21. The implant as set forth in claim 16, wherein said cells on said membranous tissue layer are in a predetermined pattern as depicted in Figure 3 or Figure 5.

22. The implant as set forth in claim 16, wherein said cells are separated by a patterned stencil.
23. The implant as set forth in claim 16, wherein said bioabsorbable substrate comprises a material selected from the group consisting of glass, collagen, glycosaminoglycans, chitosan; poly(hydroxyalkanoates), poly( $\alpha$ -hydroxy acids), polyglycolic acid (PGA), polylactic acid (PLA), polylactide-polyglycolide (PGA-PLA) mixtures, alloys and copolymers (PLGA), poly(dioxanones), poly( $\epsilon$ -caprolactone); poly(ortho esters), poly(anhydrides), poly(phosphazenes), poly(amino acids), and other compounds, polymers, copolymers, alloys, mixtures and combinations thereof.
24. The implant as set forth in claim 16, wherein said polymeric substrate is formed of a material selected from the group consisting of poly-lactic acid, polyglycolic acid, polyorthoesters, polyanhydrides, polyphosphazines, poly-lactic acid glycolic acid copolymers, polyethylene glycol/polylactic acid copolymers and blends and copolymers thereof.

25. The implant as set forth in claim 16, wherein said membranous tissue layer is about 2 to about 5 micrometers in thickness.
26. The implant as set forth in claim 16, wherein said membranous tissue layer has micropores or pits.
27. The implant as set forth in claim 16, wherein said membranous tissue layer has a micropattern of biomolecules.
28. The implant as set forth in claim 27, wherein said biomolecules of said micropattern of said membranous tissue layer are selected from the group consisting of proteins, peptides, organic molecules, oligosaccharides, and small chain polymers.
29. The implant as set forth in claim 27, wherein one or more of said biomolecules of said micropattern of said membranous tissue layer are selected from the group consisting of poly (methyl methacrylate),

polystyrene, poly (methyl styrene), collagen, keratin sulfate, hyaluronic acid, glycosaminoglycan, octadecyltrichlorosilane, silane polymers, polylysine, polylactic glycolic acid (PLGA)-derivatized polylysine and polylysine peptides.

30. The implant as set forth in claim 16, wherein said implant is in a subretinal space.
31. The implant as set forth in claim 16, further comprising a microfluidic network placed onto said microfabricated membranous tissue layer.